

WE CLAIM:

1. A method of inducing hair cell generation or inner-ear-supporting cell growth, regeneration, and/or proliferation, comprising contacting an inner-ear-supporting cell which expresses HER2 and/or HER3 receptors with an effective amount of an isolated ligand which activates HER2  
5 and/or HER3 receptors or a combination thereof.
2. The method of Claim 1, wherein the activating ligand is a heregulin polypeptide, heregulin variant, heregulin agonist antibody or fragment thereof capable of binding to the HER2 or HER3 receptor.
3. The method of Claim 2, wherein the activating ligand is human heregulin or a fragment thereof.
- 10 4. The method of Claim 2, wherein the activating ligand is selected from the group consisting of HRG- $\alpha$ , - $\beta$ 1, - $\beta$ 2, - $\beta$ 2-like, and - $\beta$ 3 and fragments thereof.
5. The method of Claim 2, wherein the activating ligand is  $\gamma$ -HRG or a fragment thereof.
6. The method of Claim 2, wherein the activating ligand is recombinant human heregulin or a fragment thereof.
- 15 7. The method of claim 2, wherein the supporting cell is in cochlear implant.
8. The method of Claim 1, wherein the activating ligand is administered at a daily dose of about 1  $\mu$ g/kg to 100 mg/kg.
9. The method of Claim 2, wherein the activating ligand is an agonist antibody.
10. The method of Claim 1, wherein the contacting is by administration to a patient in need  
20 thereof.
11. The method of Claim 6, wherein the heregulin is rHRG- $\beta$ 1-177-244.
12. The method of Claim 1, wherein the inner-ear-supporting cell is in the utricle or cochlea.
13. The method of Claim 1 wherein the inner-ear-supporting cell expresses HER2, HER3, or both.
- 25 14. A method of increasing the number of inner ear supporting cells, comprising administering to a patient in need thereof an effective amount of an isolated HER2 and/or HER3 activating ligand.
15. The method of Claim 14, wherein the activating ligand is a heregulin polypeptide, heregulin variant, heregulin agonist antibody or fragment thereof capable of binding to the HER2 and/or  
30 HER3 receptor.
16. A method of treating a hair cell related hearing disorder, comprising administering to a patient in need thereof an effective amount of an isolated HER2 and/or HER3 activating ligand.
17. The method of Claim 16, wherein the activating ligand is a heregulin polypeptide, heregulin variant, heregulin agonist antibody or fragment thereof capable of binding to the HER2 and/or  
35 HER3 receptor.
18. A method, comprising the steps of:
  - (a) obtaining an inner-ear-supporting cell sample from a mammal;
  - (b) contacting the sample with a ligand which activates HER2 or HER3 or a combination thereof to induce growth and/or proliferation of inner-ear-supporting cells in the sample and to obtain an  
40 expanded sample; and
  - (c) re-introducing the expanded sample into the mammal.